

NOTES ON "HETEROPTERA OR TRUE BUGS OF EASTERN NORTH AMERICA."¹

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For the most part previous notices of this work have been perfunctory. Their uncritical character is well shown by the fact that none of them mentioned the serious errors in the work which have been pointed out² by Dr. H. H. Knight (some twenty in the family Miridae) and by Mr. H. G. Barber.³

The writer thinks that critical discussion of the work should be continued by specialists in different groups, so that its true value may be more nearly realized. In the first line of the introduction the author refers to the work as a manual, yet he includes in it the original descriptions of 33 new species or varieties, and introduces various controversial and critical matters, all of which have no legitimate place in a manual. By the same token these things have no place in a work "prepared mainly for the use of the tyro" (p. 5), nor do such other features as the proposal of new names of tribes, and even of higher groups.

Stress is laid upon simplicity of language used in the work, but it is a strained simplicity that rejects such definite and readily learned terms as sternite and tergite, and uses such other at least equally difficult ones as thamnophilous, hygrophilous, etc. Regardless of whether the book was especially made for the tyro it is certain that on account of the prevalence of errors the tyro is the very one who cannot safely use it. On the other hand, the experienced systematist who can see for himself some of the pitfalls it contains and have an ever-present consciousness of the probable occurrence of others will often find the compilation convenient. The tyro who would have to accept things at face value would in many instances be led far astray.

Page to page comment occurring to the writer follow:

(P. 6). "I was able to study undoubted correctly named specimens." This statement is possible only from one who believes in the fixity of species and in the infallibility of systematists. It must be said, however, that systematic entomology has not yet

¹ Blatchley, W. S., 1116 pp., xii pls., 215 figs.

² Bul. Brooklyn Ent. Soc. 22, No. 2, April, 1927, pp. 98-105.

³ Bul. Brooklyn Ent. Soc. 22, No. 5, Dec., 1927, pp. 241-244.

reached this stage of precision; for instance, recent studies of Thyreocorinae have developed that 3 of the 13 species treated by Blatchley have been misidentified by nearly all authors, as they are by him. Revisionary studies no doubt will reveal similar situations in numerous other groups. Science is approximate, not exact, knowledge and nowhere is the state of flux more evident than in taxonomy.

(P. 6). The footnote (No. 6) is one of the things the omission of which would have improved this book. It does not tell the whole story, and undoubtedly the non-cooperators had what seemed to themselves satisfactory reasons for their attitude. They are identified just as certainly as if mentioned by name, and a criticism against them is on permanent record; if they do not choose to give equal publicity to replies, misapprehension will be lodged in many minds. *A priori*, what legitimate expectation can a compiler have that 27, or any other given number of specialists will freely cooperate to enable him to produce a work on a subject in their field? Common sense answers "None." Since in this particular case several of the specialists solicited had previously announced that they had in preparation a similar work, the degree of cooperation given Blatchley is simply miraculous. He should have been so thankful for the general and generous assistance that no thought would have arisen of publishing such querulous footnotes as disfigure pages 6 and 1062.

(P. 6). "The classification and sequence followed in this work represent my own opinions and not those of any previous author." This grandiose statement is unjustified as the sequence followed is, with slight exceptions, that of the Van Duzee Catalogue (see Blatchley's, page 661), a compromise of the various systems proposed by leading Hemipterists whom Blatchley is pleased to call "closet naturalists." In defense of field naturalists he avers that environment produces "minor changes in structure and color." Even so, but these things have nothing to do with major classification.

(P. 7). "I have raised to family or subfamily rank a number of groups formerly regarded as subfamilies or tribes." Avoidance of such unnecessary innovations in a manual might have partially obscured the necessary conclusion that the author is essentially a provincial entomologist. Study of the world fauna always indicates the desirability of decreasing rather than of increasing the number of the higher categories of classification.

(P. 7). "A genus should be based on certain definite and fixed structures and once so founded all species then or thereafter assigned to that genus should possess those structures." The correct statement is, that a genus is based on a genotype and includes all species deemed by a given authority as properly associable with it. The original definition may fail to mention any of the characters which later study of additional species proves to really link up the assemblage. The characters ultimately proving of generic importance may not have even been seen by the original author, so how could he have based it on "certain definite and fixed structures"? Besides "fixed structures" scarcely exist among insects and there is no such entity as a "set of generic characters."

(Pp. 7-8). Despite the remarks at this point, trinomials in the body of the work are mostly not marked so as to indicate whether the form is regarded as a variety or as a subspecies. These two categories are all that are needed to cover the six mentioned by Blatchley, and it is easy to write *Alpha beta* var. *delta* or *Alpha beta* subsp. *gamma*, and not leave in doubt what status the form is considered to have. Omitting the trinomial for the typical form is illogical, and misleading to the tyro, as he invariably gets the idea that a species and its variants are distinct things, not the true one that all of the latter together make up the former. He also imbibes the notion that the form with only two names is in some way of superior rank to those with three, whereas under this usage it is on just the same footing. Trinomials properly used have a teaching value in pointing out the composite nature of certain species, and the correlation of certain variations with range, educational features of which the postulated tyro audience should not be deprived.

(P. 8). "In many cases I have not recognized the so-called geographical races or color varieties of recent authors. . . . intermediates are almost sure to be found and there is little use and often much resulting confusion in giving or recognizing a name for each slightly variable form." This comment shows complete misconception of taxonomic recognition of geographical races and color varieties. Of course intermediates occur; if they did not the forms would be recognized by specific not sub-specific designations.⁴ In opposing the recognition of geographical races

⁴ For a full discussion of this matter see *Ent. News*, 31, 1920, pp. 46-55 and 61-65.

the author is setting himself against the almost universal practice of American systematists in ornithology and mammalogy, fields in which taxonomy in general is much more highly developed than it is in entomology.

(P. 8). "To name numerous color varieties based upon the variation of the amount of fuscous or red of the pronotum or elytra, as has been done in *Paracalocoris*, and other genera, is nonsense." This is personal opinion merely and is opposed both in theory and in practice by persons having as much standing as hemipterists as its author. The joke of it is—or is it a sorrow?—that Blatchley himself has participated in this nonsensical business in naming *Paracalocoris novellus*, which turned out to be a synonym.

Seriously, however, the beginning of knowledge of noteworthy variants is when they are formally described and given a name. Then others will know definitely what the author of the name has, and will be able to collate their own notes and specimens. The history of taxonomic entomology is replete with examples of forms first recognized as varieties, and later elevated to specific rank. Even if this never happens the value of having names under which observations on the variants can be segregated is great, and as stated, it is only by the aid of names that knowledge of these forms and what they signify will accumulate.

(P. 12). "The bug is an animal which has no inner skeleton . . . whatever." The tentorium at least is an exception to this dictum.

(P. 13). "Chitin itself is insoluble." Shades of Javelle and Labarraque! (See any microscopist's vade-mecum for methods of dissolving chitin.)

(P. 18). "This osteole is the external orifice of the stink gland, and through it is emitted *at the will of the bug* a liquid or vapor . . ." The italicized words form a speculation which should have an interrogation mark appended.

(P. 18). The scutellum is treated as if it were not part of one of the primary segments of the thorax; it is a sclerite of the metathorax.

(P. 18). The description of the fore-wings of Heteroptera differs but little from the conventional and very erroneous one. See later remarks on page 21.

(P. 19). In Fig. 3, the hog-louse is included among bugs although is not so treated in the text of the manual, nor by entomologists in general nowadays. (This is a borrowed cut.)

(P. 21). Metabola should be Holometabola; see Heterometabola four lines lower.

P. 21). The definition of Heteroptera and the criteria for separating them as a distinct order from Homoptera are no more satisfactory than previous attempts. Most Homoptera have the front wings more horny than the hind ones. The Flatoidinae in general have the wings flat in repose, more so than some Heteroptera; *e.g.*, Notonectidae; and all of the gibbous groups as Thyreocorinae, Canopinae, Megaridinae, various Schizopterinae, etc. The apical portion is not more membranous than the basal one in Enicocephalinae (see Blatchley, p. 502, "elytra wholly membranous"), in Ploiariinae (see Blatchley, p. 511, "elytra . . . of uniform texture throughout"), in Piesmidae (p. 447), Tingitidae (p. 448), in various smaller groups, and in brachypterous forms of divers families. On the other hand, numerous Cicadidae have the basal part of the forewing thickened and definitely marked off from the thinner apical portion; the genus *Clastoptera* of the Cercopidae has as genuine a membrane as many of the Heteroptera. Moreover, a definition based chiefly on wings cannot be satisfactory in a group in which brachyptery is prevalent, and absence of all wings occasional, the latter being the only condition in which bugs of an entire family, the Termitaphididae are known. The head is just as much deflexed in certain Heteroptera, *e.g.*, Schizopterinae, Peloriidiidae, Corixidae, Notonectidae, etc., as it is in the average Homoptera.

The structure of the beak unites Homoptera and Heteroptera in a definite unit readily separable on that character from all of the other orders of insects. No one has yet advanced adequate morphological reasons for separating these two groups as orders; and certainly no new data is brought forward in the manual.

(P. 23). "The male mounts the back of the female as in the Coleoptera." The copulatory position is uniform neither in Coleoptera nor in Heteroptera.

(P. 23). Ostiolar secretion. "In the family Pentatomidae or 'stink-bugs' and Coreidae or squash-bugs, it is, however, notorious and offensive. Birds . . . soon learn to avoid the bugs which excrete this odor." (See similar sentences lower down on page 23 and in second paragraph on page 24.) This is the old anthropomorphic, unreasoned, and unverified statement about birds avoiding nasty bugs. It is almost wholly without foundation and the two families mentioned contribute importantly to the food of most of the larger insectivorous birds.

(P. 24). Naucoridae presumably intended for Naucoridae.

(P. 32). The exception in foot-note (no. 13) to the general statement that antennae of Pentatomoidea are 5-segmented, must mean specimens, not species, of *Corimelaena* and *Amnestus*. The short second segment is demonstrable in any bugs of these genera except in abnormal individuals in which the second and third may actually be fused in one or even in both antennae.

(P. 32). Paragraph e. "Front legs not raptorial." Are they not just as much so in certain Lygaeidae included here as they are in many Reduviidae the alternative group?

(P. 33). The statements about beak here and at paragraph cc, p. 34, should read *apparently 3-segmented*. When beaks of these groups are cleared in potassium hydroxide and carefully examined the extra segment at base can readily be distinguished. At this writing the reviewer has just re-examined cleared specimens of *Mesovelia mulsanti*, *Salda ligata*, *Cimex lectularius*, and *Hydrometra martini*, representing as many different families. All have 4-segmented, not 3-segmented, beaks as usually stated.

(P. 34). First footnote (No. 15) endeavoring to point out an error in McAtee and Malloch on Cryptostemmatidae is itself in error. Blatchley did not observe that the statement he quotes from page 2 of that revision applies to the subfamily Cryptostemmatinae, not the family, and naturally does not agree with the definition on page 3 of the contrasted subfamily, Schizopterinae. He has the matter straight in his key on page 647.

(P. 34). "The members of this superfamily all agree in possessing 5-jointed antennae." This does not apply to some exotic forms, and does not agree with his own footnote on page 32, although that itself is erroneous. See first comment on page 32.

(P. 34). Scutellum U-shaped; a poor simile; the exposure of the abdomen beyond the periphery of the scutellum is more truly U-shaped.

(P. 34). Miroidea is selected in preference to Cimicoidea apparently because the Miridae are more prevalent and more "typical" (see footnote 16). Why then is Scutelleroidea given preference to Pentatomoidea? In passing it may be noted that this spelling is not in agreement with that customarily used by entomologists for superfamily names in which the ending is -oidea.

(P. 34). While the number of families into which Heteroptera should be divided is a matter of opinion, adoption of any writer's proposals in this respect will depend upon the showing of rea-

sonability he can make for his scheme. In subdividing his Scutelleroideae, Blatchley relegates Acanthosominae to subfamily rank while it has more distinctive characters than he cites for separating Podopidae from Scutelleridae. It is evident from inspection that the characters used in his primary division of the Scutelleroideae are relative or subject to exceptions and not at all the sort of characters that should set off such important taxonomic segregates as families. The statement "opaque part of corium much narrowed toward apex" is not true of certain Threocorids (*Euryscytus*) which is nevertheless covers in this key.

The Pentatomid segregates differ from each other chiefly by relative characters or by varying combinations of characters and can very well be treated as a single family.

(P. 36). Scutelleridae. "These . . . appear to be nowhere common in this country." *Homaemus parvulus* and *Eurygaster alternata*, at least, are locally common.

(Pp. 36-37). The subfamilies of Scutelleridae are suppressed, just the opposite tendency to that manifested in the superfamily key.

(P. 50). Describes a new variety from outside of his region in a footnote (no. 20).

(P. 53). Gives Graphosomatinae as a synonym of his Podopidae, but the genus *Graphosoma* has none of the superficial characters he gives in paragraph cc on Podopidae in his key to families on page 35.

(P. 58). The apex of the head is not rounded in all Thyreocorids; it is truncate in many and rather acute in a few.

(P. 58). "Our North American species are . . . placed in three genera. . . . Since the genus *Corimelaena* (White, 1839) is the oldest of these, it serves as the basis for the family names as above used." This is another instance of provincial entomology. It is certainly a new departure in taxonomy to vary the family name on geographical grounds. The oldest genus in this group is *Thyreocoris* Schrank, 1801.

(P. 58). "The family has by Van Duzee and recent authors been combined with the Cydnidae, but the characters separating the two are sharper and more distinct than those separating the Scutelleridae and Pentatomidae. Moreover the habits of the two groups are very different . . ." Since Corimelaenidae and Scutelleridae are placed together in one of his primary divisions of Scutelleroideae and Cydnidae and Pentatomidae in the opposed

division, they are separated by the same characters and it is difficult to perceive any excuse for commenting on differential values in the two cases. The argument, however, is very good support for our contention (5th paragraph of comment on page 34) that the families of Pentatomids of this manual are not well grounded. The habits of the two groups from the imperfect knowledge we have of them are not very different; Corimelaenids as well as Cydnids are to be found about plant roots especially in sandy soil, *Cydnoidea* being habitual burrowers. On the other hand, *Sehirus* of the Cydnids occurs commonly on foliage of plants of the mint family. Moreover, habits have nothing to do with classification. Permitting them to have weight in this connection is reversion to the ancient practice which placed whales among the fishes.

(P. 60). Blatchley says *Cydnoidea renormatus* is known only from Colorado and Illinois; Arizona can be added.

(P. 65). Paragraph a. "reflexed narrow side margins of pronotum obsolete before reaching the polished nodulose hind angles. 28. anthracina." There is no contrast in this character between this and other species of the genus treated here.

(P. 66). Blatchley errs with most authors in applying the name *lateralis* Fabricius to a species not agreeing at all with the original description. Fabricius says "Body smooth, black, shining, elytra alone white; a broad black vitta which scarcely attains apex." This description certainly does not apply to a form in which the elytra are black, narrowly edged with whitish. More probably *lateralis* is a prior name for *pulicaria* Germar.

(P. 68). Blatchley says (footnote) that in Uhler's original description of *Corimelaena minuta* there is no character that "distinguishes it from *marginella* as here recognized." Another case of hurried reading. Uhler says "upper surface densely, minutely, roughly punctate all over," which certainly is not true of *marginella*, and he says of elytra "orange, with a narrow, black, slightly waved line near the interior margin." Blatchley says *marginella* has the costal border pale, not widened at base. It is the same error as in the case of *lateralis*; one form has a pale elytron with dark vitta, the other a dark elytron with pale vitta. These of course are only gross color characters. There are excellent structural characters to distinguish *minuta*, a species so distinct as to be easily recognizable by the unaided eyes. *C. minuta* as Blatchley says is so far unknown from the United States.

(P. 118). It may be desirable to treat *Thyanta accerra* McAtee as a district species, but it certainly is not a variety of *calceata* as suggested; in scutellar characters it resembles *custator*.

(Pp. 159-160). Under *Nezara viridula*, nothing is said of the striking variety *torquata* Fabricius, known from various southern states.

(P. 208). The characters advanced for separation of the coreid bugs into families are either weak or subject to exceptions and are not at all of the type required for definition of satisfactory groups of the family rank. The classification of the pentatomids, coreids and other Hemiptera Trichophora could have been much improved if the trichobothrial characters had been taken into account. Important papers on these have been published by Alb. Tullgren (*Ent. Tidskr.*, 39, 1918, pp. 113-133) and J. R. Malloch (*Bul. Brooklyn Ent. Soc.*, 16, 1921, pp. 54-56).

(P. 210). "The two species [of *Merocoris*] are easy to separate when one has specimens of both in hand, but quite difficult from the literature extant." A key using the principal character advanced by Blatchley was published by the reviewer in *Bul. Brooklyn Ent. Soc.*, 14, 1919, p. 15, where the forms are recognized as subspecies, a treatment the data given by Blatchley by no means render undesirable.

(P. 222). *Leptoglossus magnoliae* Heid. was not based on a Florida specimen as stated; the type locality is Washington, D. C. (see *Proc. Ent. Soc. Wash.*, XII, 1910, p. 192), although Heide-mann had material also from Florida, Georgia, and North Carolina.

(P. 229). Says *Mozena obesa* Mont. is not recorded from outside of Florida. H. G. Barber has published (*Journ. N. Y. Ent. Soc.*, 34, 1926, p. 211) Mississippi, Kansas, and Nebraska records in a paper referred to in other connections by Blatchley.

(P. 241). "Two species [of *Chelinidea*] are known." This ignores Hamlin's two species published in *Proc. Royal Soc. Queensland*, 35, 1923, and included in a key in *Ann. Ent. Soc. Am.*, 17, 1924, p. 195. The proper name for the eastern form is *Chelinidea vittiger* subspecies *aequoris* McAtee. As to the quad-rinomial name for varieties, if subspecies have them the only recourse in naming them is quadrinomials.

(P. 263). "McAtee (1919, 8) says that about Washington, D. C., the nymphs occur only on *Ceanothus americanus*." This is inexact; McAtee said "I have not found the nymphs upon any other plants," which is quite a different thing.

(P. 337). "Heteroptid" a highly original but undesirable contraction.

(P. 354). The "closely allied Lygaeid" mentioned belongs in a distinct subfamily.

(P. 365). A manuscript name of H. G. Barber is here published in such a way that Blatchley will be authority for the species.

(P. 376). "Van Duzee, following McAtee, has made this a variety of *bullatus*, but if form of body, and texture and sculpture of elytra count for anything in taxonomy, it is a distinct species." The form in question is *discopterus* Stål which is nearly always brachypterous. In brachypterous forms of hemiptera "the form of body, and texture and sculpture of elytra" may be very greatly changed from what they are in macropterous examples, hence Blatchley's remark instead of being an incisive criticism (as phrased) is simply another manifestation of narrow view.

(P. 401). Footnote 51. "Quaintance (Bull. 42, p. 564, Florida Exp. Station) under the name of *P. vincta* Say, records *O. basalis* as injurious to strawberries at Lake City and calls it 'The Strawberry Pamera.' His figure and notes under description show plainly that he had at hand *O. basalis*, not *vincta*." The fact is Quaintance had neither *vincta*, nor *basalis*, but in reality *bilobata* Say. Size alone will serve to distinguish these three species, as shown by the measurements Blatchley himself gives. Quaintance had the largest form and his figure showing a dark bar across costal area behind middle runs in Blatchley's own key to a group including only *bilobata* and another species which no one as yet has endeavored to bring into this particular case. The reviewer has several times received *bilobata* with the report that it was damaging strawberries.

(P. 419). The Plummers Island, Maryland, record for *Tempyra biguttula* Stål is cited merely as an illustration of what occurs throughout the book, omission of the names of collectors. Where it is desirable to give credit for collecting a rare insect it certainly should be to the actual collector rather than to the owner of the collection from which it was seen.

(P. 433). A manuscript name of H. G. Barber is here published in such a way that Blatchley will be authority for the species.

(P. 444). *Dysdercus obscuratus* Dist. A definite record for the United States is published in Ent. News, 37, 1926, p. 14.

(P. 447). Does not mention the peculiar cavities on under side of the thorax among characters of the family Piesmidæ.

(P. 447). "Of the ten nominal species [of *Piesma*] recognized by McAtee." Despite the implication of this remark, these species are no more nominal than others; what is evident is that Blatchley hasn't seen them.

(P. 451). The name Tinginæ for a subfamily does not accord with Tingididæ which he uses for the family.

(P. 470). *Leptobyrsa rhododendri* Horváth (*explanata* Heid.) certainly is not "an introduced European species" as stated. This remark may be true for the preceding species *Stephanitis pyrioides* Scott in connection with which nothing of the kind is said.

(P. 499). The locality name Marsh Hall should be Marshall Hall.

(P. 513). Footnote 62. There is no conflict between the two statements quoted from McAtee and Malloch, though an effort is made to have it appear that there is.

(P. 514). Notes that *Stenolemus pristinus* McAtee and Malloch is a synonym of *S. longicornis* Blatchley, but he says nothing of his obtaining this priority by sending to the press⁵ a description so poorly prepared that this species was included in a genus *Malacopus* Stål described from Brazil, with which it has nothing to do. The revised generic description presented by Blatchley, therefore, is futile.

(P. 521). "Moreover, an astute observer like Say would not have overlooked the prominent tubercle on the basal margin of pronotum." Blatchley removes the name *errabunda* Say from one tuberculate species (*tuberculatus* Banks) and places it on another (*parshleyi* Bergroth). In Bergroth's key *errabunda* and *parshleyi* fall in different sections according to absence or presence of a median tubercle on base of pronotum. Perhaps neither Blatchley, nor McAtee and Malloch, but Bergroth had the real *errabunda*. Since agreement on the identity of *errabunda* seems unlikely, and no type is extant, it may be best to drop this name and use *tuberculatus* Banks, and *parshleyi* Bergroth, the type specimens of which are extant.

(P. 523). Blatchley gives his conclusion that *Empicoris vagabundus* L. and *E. pilosus* Fieb. are very distinct species, but no

⁵ Ent. News, 36, 1925, pp. 45-46.

adequate reasons for it. Both are European forms, that have been commonly regarded as varieties of a single species, a practice that requires no change due to any data brought forward in the manual.

(P. 529). "The above is the brief original description of this form" (*Emesaya lineata* McAtee and Malloch). This would imply that the description quoted was the total original description, which it decidedly is not. There are more than 50 words of description of structural characters in the parts of the key relating to *lineata*, which must be considered as part of the original description. This is a method of description adopted for economy in preparation, in printing, and in reading, one which Blatchley says (p. 5) he uses himself, but of which he has complained in correspondence, and by implication criticizes in the extract quoted.

(P. 532). "The genus *Barce* not being represented in America." The genus *Barce* was first validated by description of a species from Wisconsin; it is a synonym of *Metapterus* Costa, the name used by McAtee and Malloch.

(P. 536). Beak said to be 3-jointed, but figure shows either a 4-segmented beak or a 2-segmented head! (A borrowed illustration.)

(P. 540). *Oncerotrachelus*. "Two species are known, one from Grenada, the other from our territory." In reality four species are known, two of them from the United States. See Ann. Ent. Soc. Am., 16, 1923, pp. 249-250.

(P. 554). *Triatoma ambigua* Neiva placed as a variety of *T. sanguisuga* Lec. is a different species that has been redescribed as *T. pintoii* (Larrousse, Ann. Parasitol., 4, 1926, pp. 138-139).

(P. 601). *Nabis brevis* Scholtz. "On nursery stock imported from England." There is no more reason for including this than many other imported bugs. If we listed all of those intercepted by inspectors of the Federal Horticultural Board our catalogs would grow very rapidly.

(P. 620). The phrases, "pronotum always present," and "meso- and meta-sterna separated by a distinct suture," in the definition of Miroidea, refer to facts so obvious that one is at a loss to account for their inclusion here. They would fit just as well in a definition of the whole suborder. Possibly these are mistakes in paraphrasing from the definitions of the superfamily by other authors; if attempt is made in the second to clarify

Reuter's term "sternum composite," failure has resulted as the "suture" Reuter had in mind in this connection is not the usual transverse suture between body segments, but a longitudinal pseudo-suture.

(Pp. 620-621). The key to families of Miroidea fails to take into account pertinent publications, especially those of McAtee and Malloch, on Annectant Bugs (Bul. Brooklyn Ent. Soc., 19, No. 3, June, 1924, pp. 69-82, pl. I; 21, Nos. 1-2, April, 1926, pp. 43-47, and Proc. Biol. Soc. Wash., 38, pp. 145-147, pl. IV, Nov., 1925). Paragraph a. "Ocelli present" is not in order since in one of the included families, Cryptostemmatidae, ocelli are often absent. Paragraph b. "Tarsi 3-jointed," similarly does not apply, because those of American Isometopidae at least are 2-segmented. Paragraph c. "Beak 3-jointed." This point needs reinvestigation throughout the Heteroptera and while the reviewer does not pretend to complete knowledge for the Miroidea, it is probable from results already obtained that the beak is fundamentally the same in all the families and that it is 4-segmented. Paragraph dd. "Macropterous forms only known." The Cryptostemmatidae to which this remark is applied have numerous brachypterous forms.

(P. 649). "The description of *C. niger* Uhler (1904, 361) from New Mexico agrees in all particulars with that of *vagans* M. & M., but they state that the type of *niger* is lost and so described the species as new." This is a misleading statement of the facts. Uhler compares *niger* with his "*brasiliensis* Reuter," which was the same as Uhler's *latipennis*, a species McAtee and Malloch keep separate from *vagans* in their treatment. Manifestly, therefore, the description could not agree in all particulars with that of *vagans*, nor in actuality does it so agree. McAtee and Malloch state that "The name *Ceratocombus niger* Uhler may possibly have been applied to specimens of this widely distributed species" and discuss the lost type and damaged paratype. Theirs is a fair statement of the matter, Blatchley's is not.

(P. 657). The Bergrothian view of the generic distinctness of *Teratodia* Bergroth from *Diphleps* Bergroth is adopted, ignoring McAtee and Malloch's second contribution (Bul. Brooklyn Ent. Soc., 21, pp. 46-47, April, 1926) to the subject, in which they state that the type specimens were submitted to several American hemipterists, who agreed that the two so-called genera were but sexes of the same species.

(P. 658). The generic name *Mallochiola* Bergroth used by Blatchley for *Idiotropus gagates* McAtee and Malloch probably is unnecessary. Examination of *tenella* Zett with which Fieber's species were synonymous shows that *gagates* M. & M. differs from it only in relative characters, not in definite structural details. *Idiotropus* Fieber is made a synonym of *Myrmedobia* Baerensprung by some authors.

(Pp. 660-964). See comment by Dr. H. H. Knight (Bul. Brooklyn Ent. Soc., 22, No. 2, April, 1927, pp. 90-105) to which I have only the following two notes to add:

(P. 698). "McAtee (1916, 386) has named the pale form var. *ablutus*, though Reuter expressly states that the general color of the typical form is 'pallide flavo-testaceus leviter nitidulus.'" McAtee's reason was possession of type material from Aurora, W. Va.; if the holotype, probably in Helsingfors, does not support the action, well and good. On available knowledge, however, in view of the "type system" the action taken was justifiable.

(P. 880). "As pointed out by McAtee and Malloch (1924, 71), *Peritropis* is an aberrant genus in that the tarsi are 2-jointed instead of 3-jointed as in other Mirids. They regard it, therefore, as an 'annectant' or connecting link between the families Miridae and Isometopidae. The absence of ocelli and the two closed cells of membrane denote, however, that it is a true Mirid." This latter remark suggests the query, "What is a 'true Mirid?'" the reviewer's answer to which would be, "Nobody knows." There is no finality to knowledge in science, least of all in entomological taxonomy. We do not know Miridae and we do not know Isometopidae enough to define them definitely and to say whether there may or may not be numerous intergrading forms. To come to details, *Diphleps* an Isometopid has two closed cells in membrane, and 2-segmented tarsi, as in *Peritropis* the "true Mirid," besides agreeing with that genus in structures common to the Miroidea, as well as in texture and coloration. It is certainly legitimate to apply the term annectant to such a form. The genus *Mevius* of Distant described from India is a synonym of *Peritropis* and examination of a species in the British Museum revealed that it also has 2-segmented tarsi.

The defects in Blatchley's manual here pointed out are only such as are obvious to a single student of Hemiptera in the treatment of groups on which he has done some work. Other stu-

